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GEA-2276D

FORM 79

NOVALUX
LUMINAIRES



GENERAL  ELECTRIC

WHY FORM 79 IS STILL For Traffic-Safety and

NEW DESIGNS FOR NEW CONDITIONS WITH ESTABLISHED ADVANTAGES

The principal objective in creating these new designs was to get the serviceability and efficiency of the aluminum Form 79's, but by using materials less essential to the manufacture of military equipment. All the basic features of construction which made the aluminum luminaires so desirable—a fact proved by six years of successful service—have been retained.

The efficiency and effective light distribution that have always characterized the Form 79 luminaires is principally the result of the basic optical design. Silvered glass has replaced *Alzak-finished aluminum as reflector material in the optical system; and while this, naturally, has required changes in the mechanical construction, the basic design has been retained—in fact, has been improved upon, since silvered glass has an even higher reflection efficiency than aluminum.

The low maintenance cost that users have experienced with aluminum Form 79's resulted primarily from a type of construction that protects the edge of the globe from damage during installation and servicing, and that eliminates dependence on gaskets in the servicing joints to keep the interior clean and dry. The globe is still permanently joined to the reflector at the factory. This method varies according to the type of glassware used, but the final result is the same—the edge of the globe is not exposed to nicking (a primary cause of breakage) at any time during the installation or servicing of the luminaire. The gasketless seal between reflector and hood has also been retained.

Hoods are made of cast-iron, or of malleable iron where flexibility is essential, but sockets, receptacles, and other current-carrying parts are unchanged. Iron and steel parts are painted after they have been given the same sort of surface preparation that is used on automobile fenders and bodies, to produce an attractive and durable finish.

In spite of these changes, however, the result is a luminaire that matches the aluminum Form 79 very closely, both in appearance and simplicity of structure. The new units weigh more and cost slightly more, but they weigh no more and cost less than much-less-efficient luminaires of a few years ago, the weight and price of which were considered quite normal then. And, as a "bonus,"



Fig. 1
Deep pendent hood
One-piece silvered-glass reflector
and globe (Form 79-S or -D)



Fig. 2
Deep pendent hood
Spun-sealed silvered-glass
reflector and refractor
(Form 79-R)



Fig. 3
Plain slip-fitter hood
Spun-sealed silvered-glass reflector
and refractor
(Form 79-R)

THE LOGICAL CHOICE

Protective Lighting

the superior mirror properties of silvered glass produce 10-per-cent more over-all light output than was previously obtainable with aluminum.

The New Form 79 in Traffic-safety Lighting

With this new construction, economical and efficient traffic-safety lighting can still be had for streets and highways. The various types of light distribution are still available—including a new special two-way distribution in the Form 79-VR. And all practical mechanical and electrical requirements can still be met.

The New Form 79 in Protective Lighting

An adequate volume and a proper distribution of light, freedom from objectionable glare, and satisfactory mechanical and electrical adaptability are at least as important in protective-lighting systems as they are in traffic-safety lighting. There is no need to put up with an inefficient or ineffective lighting system; a proper Form 79 installation will be lighting boundary fences and certain types of areas at moderate cost.

Why the Form 79 Is Your Logical Choice

It provides excellent conditions for easy seeing. Meets all practical requirements for illumination.

It's economical! It puts the light where it belongs, and prevents waste of light. Its many service-proved construction features keep efficiency up and maintenance cost down.

It's appearance is modern! It looks and is functional.

It meets all installation requirements for a safe, dependable system.

It's widely accepted! It's found on the streets of hundreds of towns and cities, on the roads and fences of hundreds of factories, where serious effort has been made to obtain safe seeing conditions at night at lowest possible cost.

You had these features in the aluminum G-E Novalux Form 79; you have them in the new Form 79, too.



Fig. 4

Heat-insulated slip-fitter hood
Spun-sealed silvered-glass reflector
and long globe (Form 79-S and -D)



Fig. 5

Heat-insulated slip-fitter hood
Form 79-VR silvered-glass
reflector and narrow-band
refractor



Fig. 6

Deep pendant hood
Form 79-VR silvered-glass
reflector and narrow-band
refractor

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How to Choose a Form 79 Luminaire for Your Project

1. **Choose a suitable light distribution** based on the nature of the project and the suggestions on pages 18 and 19. FORM 79-S luminaires produce a nondirectional, shaded distribution that is best suited for lighting intersections and areas. FORM 79-D luminaires produce an asymmetrical distribution of considerable width. They are, therefore, best suited for lighting very wide streets or areas lying almost entirely on one side of a fence. FORM 79-R luminaires produce the so-called "C-Sym-Etric" distribution, which is characterized by two relatively narrow beams that are a little less than 180 degrees apart. This unit is suitable for all street lighting where luminaires are to be side-of-street mounted on brackets or mast-arms, and can also be used for fence lighting if a sharp cut-off of light back of the unit is not essential. FORM 79-VR luminaires produce two closely controlled beams 180 degrees apart. Control of candlepower in the beam, from horizontal to 20 degrees below, and of the shading of sidewise light is particularly close. This distribution is exceptionally desirable for street and boundary-fence lighting and, in most projects, will produce the best over-all conditions for seeing.

Light-distribution curves showing the specific differences between the several types of distribution will be found on pages 6, 7, 9, and 10, together with explanations of how they are obtained. Often, more than one type of light distribution will be applicable, if so, the choice must be based on over-all cost or appearance. The engineers of the General Electric Illuminating Laboratory in Schenectady will be glad to assist you with your problems.

2. **Choose whether operation is to be series or multiple.** Form 79 luminaires are supplied with:
 1. Medium-multiple sockets for medium-screw-base lamps up to and including 200 watts.
 2. Mogul-multiple sockets for 300- and 500-watt multiple lamps. Often used for series lamps up to and including those of 10,000 lumens when operated at low voltage from Type II transformers.*
 3. Series socket and wet-process-porcelain receptacle for all mogul-screw base series lamps up to 10,000 lumens. Receptacle is rated 19 kv dry flashover to hood, and conforms to proposed NEMA-EEI standards and practices. Recommended for all straight-series circuits.
 4. Series sockets and dry-process-porcelain receptacle for all mogul-screw-base series lamps up to 10,000 lumens. Recommended

mended for operation on secondary of Type II transformer.*

Reflectors comparable to Form 79 reflectors can be had with all the common high-voltage-insulator forms of luminaires.

3. **Choose a method of mounting.** In street lighting, luminaires are preferably suspended by means of pipe brackets or mast-arms, the length of which should be sufficient to place the luminaire advantageously over the pavement in accordance with recommendations. In most protective-lighting applications with Forms 79-S, -D, and -R luminaires, it is possible to use pipe brackets that make the luminaires easily accessible from the pole. For fence lighting with the Form 79-VR, however, the universal-bracket hood for direct pole mounting is recommended, because it permits tilting the luminaire for the desired control of the light distribution. For bracket or mast-arm mounting, there is a choice of pendant or side attachment to the hood. The latter is generally preferable because it produces a higher light-center position above the ground (and also because the heat-insulated hood can be used. Refer to page 3.) For some mast-arm and for center-span suspension, only the vertically tapped pendant hood is, of course, applicable. A variety of suspension fittings is available.

4. **Choose a method of wiring.** Best appearance and electrical reliability is obtained by wiring with duplex insulated cable. Some companies, however, prefer wiring with ordinary line wire, through bushings or to external binding posts on the sides of the hood. Another practical and frequently used method of obtaining neat appearance and best insulation values at moderate cost consists of wiring with duplex insulated cable supported by insulated wire holders and entering the hood through porcelain or gland-type bushing. There are Form 79 hoods available for all methods of wiring.

For safety, luminaires and brackets supplied from high-voltage circuits of above 600 volts should be well grounded, or Type II insulating transformers should be used. Considering the difficulty and expense of grounding under most conditions, the use of the Type II transformer is preferable. Alternatively, wet-process-porcelain insulator heads are to be preferred for all series circuits.

When ordering hoods with gland bushings, specify the outside diameter of the cable.

5. **Choose the exterior finish.** The standard glossy, dark-green, Glyptal enamel finish is probably most satisfactory from the standpoint of appearance and durability. However, to match existing natural-finished aluminum units, a grey-paint finish is available without extra charge.

* A Type II or any comparable insulating transformer normally produces a high-peak form of voltage when operated with the lamp hanted and the use of a series socket with a time current in. Therefore, a good safeguard against radio or telephone interference, internal stress in the transformer and flashover of socket or wiring in later years. It is recommended for all applications, in preference to a multiple socket.

Construction Features

Construction of Form 79-S and -D Luminaires With One-piece Reflector-globe Unit

The Form 79-S **reflector globe unit (A)** is formed in one piece, the upper half in the standard Form 79 contour and the lower half in the familiar No. 205 globe shape, rippled on the outside. The **reflector portion (B)** includes the steps or offsets that assure long lamp life. It is chemically silvered for high reflectivity, copper-plated for added strength and protection, and painted to match the hood. A **plated-steel collar (C)** is spun over the upper portion of the reflector and carries the **latches (D)** which attach this assembly to the hood. Four latches are used on pendant hoods, three on side-mounted hoods. All are 90 degrees apart. The **hood (E)** is cast-iron, bonderized and painted. Its **reflector seat (F)** is carefully machined so that the reflector collar seats tightly against it without the use of gaskets. The hood illustrated is of the deep pendant type, with a **vertical pipe tap (G)** for 1¼-inch pipe. It carries a sturdy skeleton-type **mogul-screw-base multiple socket (H)** mounted on strong, rigid straps. What's more, it is firmly fixed in position so that the filament of a multiple or series lamp **(I)** of 7-inch light-center length will be properly focused in the optical system.

By the addition of the chromium-plated **deflector assembly (J)**, this luminaire becomes a Form 79-D. This deflector assembly is bolted to the reflector at three points and is waterproofed at each by **lead washers (K)**.

The Form 79-S or -D optical assembly can be used with any of the hoods and sockets described on these pages.



Fig. 101. Cutaway view of a Form 79-D luminaire with deep pendant hood, mogul, multiple socket, one-piece silvered-glass reflector, and clear rippled globe with internal deflector assembly

Construction of Form 79-R Luminaires with Spun-sealed Glass Reflector and Refractor

Because accurately pressed prisms are employed on the interior of the globe to obtain the desired light distribution, a Form 79-R optical unit

consists of two pieces—a **rippled-bowl refractor (L)** and a **glass reflector (M)**. The refractor and reflector are assembled with **asbestos cushions (N)** between them and with a **rust-proofed-steel band (O)** spun over the rims of the two glass pieces to hold them together. The refractor is keyed to the reflector for proper orientation. The **internal shield (P)** is riveted to a thin steel ring which is locked between the reflector and the refractor. This shield is made of chromium-plated steel.

The **hood (Q)** illustrated is of the heat-insulated type, with side-mounting **slip filter (R)** for 1¼-inch pipe, and has an internal **porcelain cable insulator (S)**. The **series socket (T)** is of the standard porcelain-shell type and engages in a **wet-process-porcelain receptacle (U)**. The receptacle is mounted on a strong **steel plate (W)** which makes it easy to remove for wiring.

The luminaire illustrated is intended for straight series-circuit operation. It is pipe-bracket mounted, and wired through the bracket with duplex insulated cable. However, the Form 79-R optical system will fit any of the hoods described on these pages.

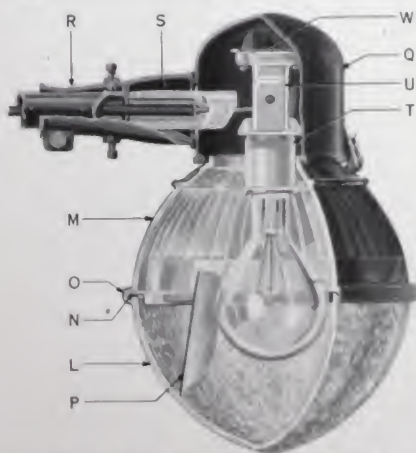


Fig. 102. Cutaway view of a Form 79-R luminaire with heat-insulated slip-fitter hood, series socket and wet-process-porcelain receptacle and spun-sealed assembly of silvered-glass reflector and rippled lateral-bowl refractor

Forms 79-S, -D, and -R

Obtain Their Efficiency and Effectiveness from This Simple Optical Design

The efficiency of these luminaires originates in a carefully designed bowl reflector, the contour of which is such that most of the reflected light is projected outward at an angle of approximately 15 degrees below horizontal (Fig. 103). It is necessarily made of specular (nondiffusing) reflecting material, for which *Alzak-finished aluminum is excellent, but for which silvered glass is even better. Observe that direct rays from the filament at and slightly below horizontal are redirected for glare suppression as well as for efficiency.

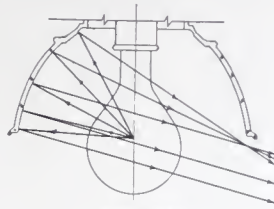


Fig. 103

The curve of resulting candlepower distribution (Fig. 104) in the vertical plane passing through the light source shows double the bare-lamp candlepower about 15 degrees below horizontal, together with a cut-off of glare-producing candlepower near the horizontal. These data were taken with a 6000-lumen, 6.6-ampere, series street lamp.

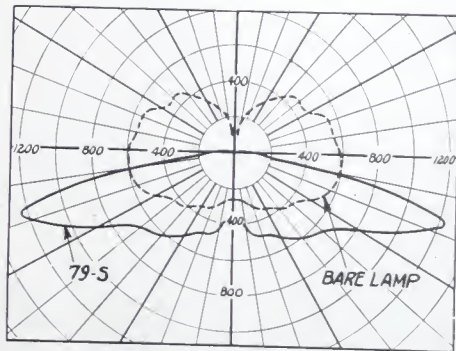


Fig. 104

With no further change in the direction of the light rays, a symmetrical-shaded distribution is obtained that is characteristic of the Form 79-S luminaire. The purpose of the globe is principally to reduce apparent brightness, improve appearance, and exclude dust and insects from the reflector surface.

For improved utilization efficiency of luminaires suspended at the side of the street or area, an asymmetric distribution is almost always preferable. This is accomplished by installing a two-piece deflector assembly within the globe (Fig. 105, 106).



Fig. 105



Fig. 106

* Manufactured under Aluminum Company of America patents.

From the curve of candlepower distribution in Fig. 107 the cone containing maximum beam candlepower, observe that the deflector changes the direction of the house-side light only.

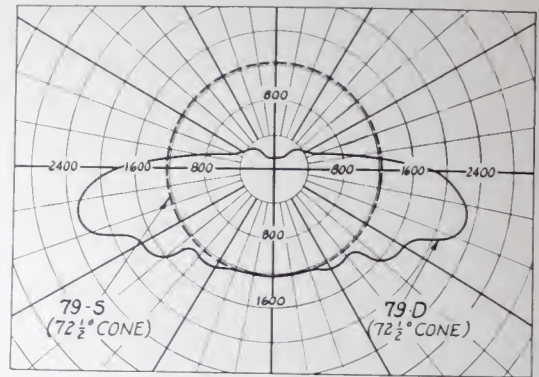


Fig. 107

The increase in candlepower values up and down the street or along a fence permits lengthening the distance between luminaires with comparable uniformity of pavement brightness. This distribution (Fig. 108) is suitable for wide streets or for areas along side fences where relatively little light is wanted back of the unit.

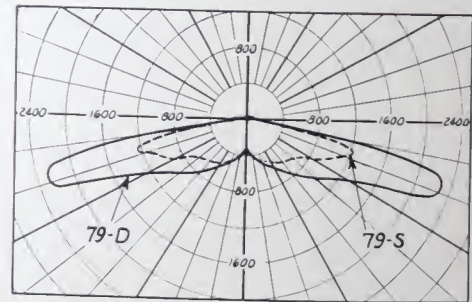


Fig. 108

Still greater utilization of light, in most street-lighting applications, is obtained by using a prismatic-refractor globe, as in the Form 79-R luminaire. The interior of this globe contains carefully designed and accurately made prisms which convert the symmetrical distribution from the reflector into two narrow beams a little less than 180 degrees apart. An interior reflecting shield is included on the house side for the dual purpose of shading that side of the street and increasing the illumination opposite the luminaire (Fig. 109, 110).

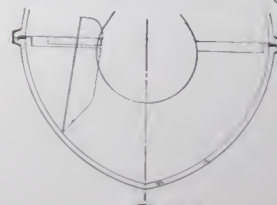


Fig. 109

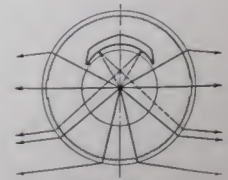


Fig. 110

Forms 79-S, -D, and -R

Obtain Their Efficiency and Effectiveness from This Simple Optical Design

The following curve of candlepower distribution in the 75-degree cone (Fig. 111) clearly shows the narrowing of the distribution thus obtained. This is the equivalent of looking down on the pattern of light distribution.

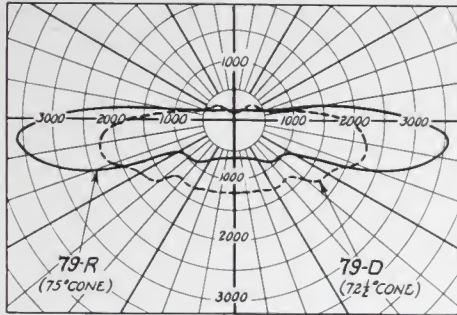


Fig. 111

Another gain in beam candlepower is thus obtained, and the candlepower distribution curves in vertical planes passing through beams (the so-called maximum vertical plane) (Fig. 112) show that this increase is obtained at the angles around 15 degrees below horizontal, where it improves uniformity of lighting and permits lengthening of spacing. There is still excellent cut-off at the higher angles to prevent objectionable glare.

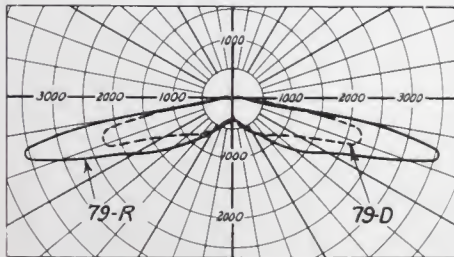


Fig. 112

The efficiency of light utilization is highest with this C-Sym-Etric distribution, and excellent results will be obtained when it is used in accordance with the IES Code or specific engineering recommendations for the project (Fig. 113).

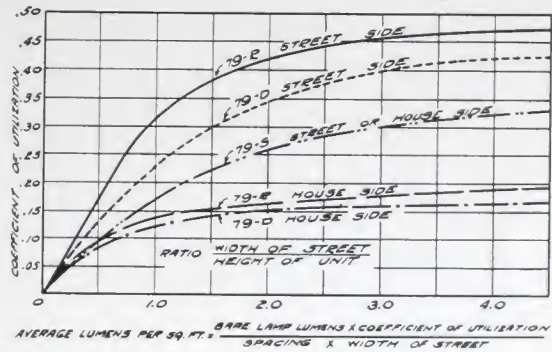


Fig. 113

A smooth reflector naturally redirects a great amount of heat and light through the central axis (Fig. 114). Tests show that where the optical system is designed for maximum candlepower at the high angle shown, there is normally an intense concentration of heat on vital parts of the lamp. It is possible to avoid lamp troubles by designing for maximum candlepower at a lower angle, thus sacrificing lighting effectiveness. The G-E method, however, employs steps or offsets in the upper portion of the reflector, each of which redirects a portion of light to one side of the central axis instead of through it (Fig. 115). This has been proved to be successful in retaining not only the desired effectiveness of light control, but also normal lamp life. This feature is standard in all Form 79-S, -D, and -R luminaires.



Fig. 114. Rays of light coming from the lamp strike the reflector and are reflected back along the same path through the focal axis



Fig. 115. Rays of light coming from the G-E reflector pass by the focal axis; hence, they cannot build up destructive heat concentrations

A Summary of Advantages

Maximum candlepower values are produced at the high angles that promote a good degree of uniformity of pavement brightness and good visibility.

Candlepower is suppressed at the angles near horizontal, where objectionable glare would result.

Three practical light distributions make it adaptable to all lighting requirements.

Simple construction results in outstandingly high utilization efficiency.

Effective and attractive lighting is obtained at economical spacings and mounting heights.

Full lamp life expectancy is obtained without restricting spacing or lighting effectiveness.

The Form 79-VR Luminaire

A New Design for a New Era

Here is a new Form 79 luminaire that is again improving the standards of excellence and economy in traffic-safety lighting for streets and highways, and in protective lighting of boundary fences. It represents the most important advancement in luminaire design since the introduction of the original Form 79, and still meets the Form 79 standards of simplicity, durability, and low price.

The Form 79-VR is the result of months of exacting engineering study. General Electric and Holophane engineers pooled their knowledge and skill with the facilities of the Public Lighting Commission of the City of Detroit to produce a luminaire ideally suited for lighting the residential streets of Detroit—an application that called for a new type of light distribution to meet the requirements of effectiveness and economy. The objectives were:

1. Effective lighting of streets and sidewalks for the safety of motorists and pedestrians.
2. Long spacing for economy in the number of luminaires.

3. Improved shading of sidewise light for the comfort of residents.
4. Simple, durable construction for low maintenance cost.

We believe that *when Form 79-VR luminaires are properly used, in the manner recommended, better and more attractive seeing conditions can be obtained with fewer luminaires of this type than with any other type that is available today*; and that applies both to street lighting and to protective fence lighting.

The character of the special light distribution provided, and the manner in which it is obtained are described on the following page. Remember that this construction is obtainable only in the General Electric Form 79-VR and that this luminaire costs but a little more than other designs which do not offer these advantages to so great an extent. We believe an investigation will show that in practically every application, you can get superior lighting at insignificantly small extra cost, or you can get the same results that you would get from other luminaires with an actual saving in the number of luminaires.

Construction of Form 79-VR Luminaires

With Pressure-sealed Glass Reflector and Refractor

The **reflector (A)** is made of pressed glass, heavily silvered for high efficiency and copper-plated for strength and protection, and then painted to match the hood. The special **vertilateral bowl refractor (B)** is pressure-sealed to the reflector by two **strap bails (C)** which extend from the **reflector collar (D)** to a **stud (E)** that passes through a hole in the bottom of the refractor. A **woven asbestos cushion (F)** is used between reflector and refractor. The optical unit is shipped assembled. The **reflector collar (D)** is made of cast iron, bonderized and painted, and carries the **toggle latches (G)** by which the optical unit is attached to the hood. Four latches are used with pendent hoods, three with side-mounted hoods. The **hood (H)** is cast iron and, in the unit shown, is supported by the **side-mounted universal bracket (I)** for direct-mounting on a wooden pole. This bracket has swivels for horizontal and vertical adjustment of luminaire position. Both hood and reflector collar are machined to provide a **tight seal (J)** without the use of gaskets. However, a woven **asbestos cushion (K)** is used between reflector and collar. The **series socket (L)** illustrated is of the standard porcelain-shell type for mogul-screw-base lamps. It seats in a **wet-process-porcelain series receptacle (M)**, which is mounted on a **steel plate (N)**. This makes it easy to remove the receptacle for wiring and inspection. With this hood, the cable enters through a bushing (not shown) in the side.

The hood and mounting brackets shown make it especially easy to use this luminaire for boundary-fence lighting; however, the optical unit can be attached to any of the Form 79 hoods described in these pages.

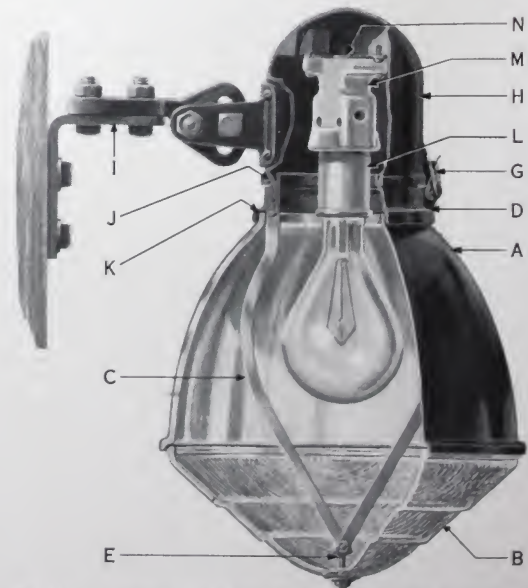


Fig. 116. Cutaway view of the Form 79-VR with side-mounted universal-bracket hoods, series socket, wet-process-porcelain receptacle, and pressure-sealed assembly of silvered-glass reflector and vertilateral rippled bowl refractor

The Form 79-VR Luminaire

New Optical Design Sets New Standards of Lighting Excellence

The reason for the Form 79-VR's outstanding lighting effectiveness is the co-ordinated design of reflector and refractor. The contour of this reflector is designed to project the bulk of the reflected light downward at an angle of approximately 35 degrees below horizontal (Fig. 117). Therefore, because most of the reflected light passes below the lamp filament, there is no need for offsets or steps to eliminate heat concentration. The reflector is necessarily made of specular reflecting material; silver glass is unsurpassed for this purpose.

The prisms used in the special refractor are of unusual design because they must necessarily lift the light rays vertically to an angle approximately 15 degrees below horizontal as well as turn them laterally to develop the desired distribution. This refractor (Fig. 118, 119) is called Vertilateral, a word derived from the vertical and lateral control

(vertical control); the second shows how the turning (lateral control) is accomplished.

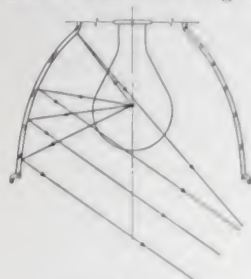


Fig. 117



Fig. 120



Fig. 121

The distribution produced is of a narrow-band type consisting of two beams exactly 180 degrees apart (Fig. 122). The difference between this and the C-Sym-Etric distribution of the Form 79-R is easily understood by examining diagrams of candlepower distribution obtained with 6000-lumen 8.6-ampere series lamps in the cone of the maximum candlepower.

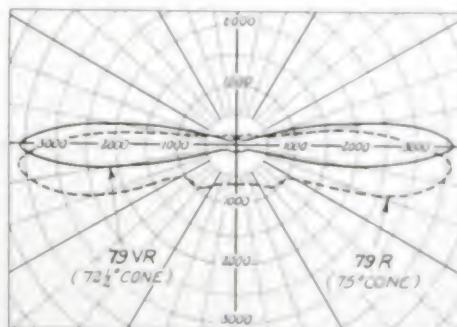


Fig. 122



Fig. 118



Fig. 119

The combined effect of reflector and refractor on the light rays from the filament is illustrated in the following two diagrams (Fig. 120, 121). The first shows how the lifting of light rays is accomplished

The Form 79-VR is obviously applicable for suspension over the center of a street or any corresponding area around a fence. Hanging vertically, the luminaire will adequately illuminate an area of 20 feet on either side. However, side-of-street mounting is entirely practical, provided that the far side of the street is not more than 20 feet from the line of luminaires, or provided that the luminaires are mounted on both sides of the street, with an illumination overlap down the center. Pole-mounting brackets and mastarms of sufficient length are available for such applications.

In the maximum vertical plane, there is a highly significant difference in candlepower distribution (Fig. 123). The Form 79-VR produces higher candlepower values at the very important angles above 75 degrees (thus enabling the light to "reach out" farther and provide better uniformity of pavement brightness), but only about the same low candle-

The Form 79-VR Luminaire

New Optical Design Sets New Standards of Lighting Excellence

power values at and near horizontal (thus restricting veiling glare in the same effective manner). These are the factors to which is attributed the ability of the Form 79-VR to produce a more effective, satisfactory job of illumination at even longer spacings than are permissible with the Form 79-R. Measurements with the General Electric street-lighting evaluator have given several VR installations higher ratings of relative effective illumination than corresponding installations of 79-R's—two or three times greater at the longer spacings frequently encountered in street lighting.

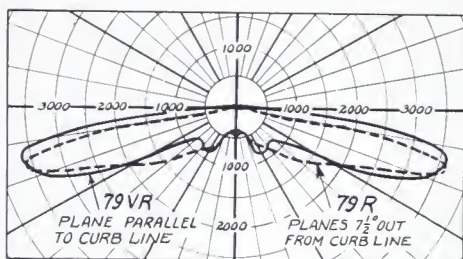


Fig. 123

Shielding of sidewise light is another important feature of light distribution (Fig. 124). Ample candlepower values are provided for excellent illumination of a zone 40 feet wide, assuming the units hanging vertically 25 feet high. Only enough light to illuminate the glass is permitted outside this zone. This is of great importance in lighting residential

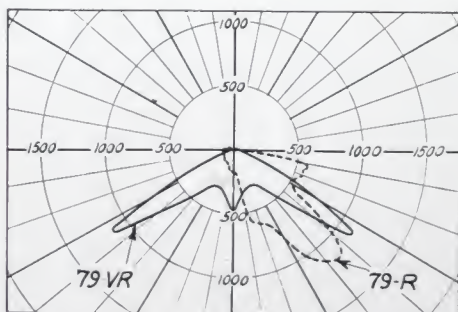


Fig. 124

streets where a good level of lighting is desired on the street surfaces but none on the houses.

These same characteristics are of exceptional value in lighting boundary fences. Here, the carefully controlled candlepower values at the high angles give more "reach" than the distribution from the Form 79-R or any luminaire resembling it, and less interference with seeing than any conventional two-way distribution. Simply by tilting the luminaire, the cutoff of light on an interior patrol road can be made complete without shields or other accessories. And by the same process, a fan of light can be projected out over the fence for long-range seeing. It is important to observe that the width of the lighted zone outside the fence is fully adjustable. It can be anything from several hundred feet for open terrain, to about 20 feet for closely settled surroundings or for shielding nearby highways or railroads. This is obtained along with, and at no sacrifice of, a highly effective illumination of the zone along the fence. As a direct result of this scientifically designed, wholly-controlled light distribution, we believe any fence can be lighted more satisfactorily—from any viewpoint—with fewer Form 79-VR's than with any luminaire designed along more conventional lines.

The utilization efficiency of this luminaire is attractively high (Fig. 125). (NOTE:—The utilization efficiency is the sum of two co-efficients of utilization—one based on the street width beyond the luminaire on the street side, the other on the street width behind the luminaire on the house side.)

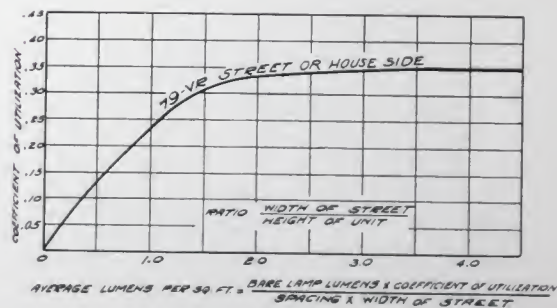


Fig. 125

Summary of Advantages

Narrow-band (180-degree) distribution highly suitable for street and fence lighting.

Carefully graduated candlepower values above 75 degrees promote better uniformity of lighting at any given spacing, or permit longer spacings for any given degree of uniformity.

Careful control of candlepower near the horizontal suppresses objectionable glare.

Excellent shading of sidewise light makes it

exceptionally well-suited for residential streets or fences which are guarded from interior patrolled roads.

In fence lighting, the width of the lighted zone is easily controlled by tilting the luminaire.

The globe appears uniformly filled with light when viewed from any angle.

Actual tests show that it produces superior over-all conditions for seeing.

Easy-to-live-with Features that Represent Extra Value in Form 79 Luminaires

Form 79 Reflectors Combine Serviceability with Outstanding Efficiency



Fig. 126. Form 79 reflectors in silvered glass are new, but their sturdiness and long life were established years ago

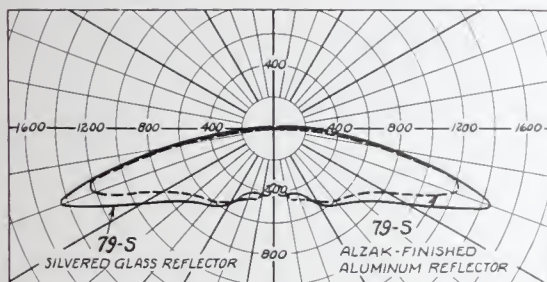


Fig. 127. Candlepower-distribution curves in vertical planes, showing how the superior reflection efficiency of silvered glass is transformed into improved lighting efficiency. Data obtained with 6000-lumen, 6.6-ampere series lamp in Form 79-S

High-transmission glass of carefully controlled quality is used for these reflectors. They are blown or pressed accurately to the required shape, and the outer surface is then heavily coated with chemically deposited silver and electroplated with copper. In the optical sense, this provides the most efficient reflecting surface obtainable—an efficiency that exceeds that of *Alzak-finished aluminum by approximately 10 per cent resulting in the most efficient practical luminaire that has ever been offered for street and protective lighting.

Mechanically, these reflectors are strong and durable. The copper backing makes them virtually shatterproof; the glass adheres tightly to the backing and has to be smashed to break it away. The copper backing also extends over the edges of the glass to protect the edges from damage in handling or servicing. What is more, full protection from heat and weather is provided by the copper backing and exterior paint finish. Years of successful experience with floodlight reflectors manufactured in this manner prove that it is entirely practical.

This construction and the advantages it affords apply to the separate glass reflectors of Form 79-R and -VR luminaires, and to the reflector portion of the one-piece Form 79-S or -D unit, as well.

Form 79 Globes Are Attractive, Efficient, and Long-lived



Fig. 128. The edges of ordinary blown globes are rough and fragile



Fig. 129. The edges of Form 79 pressed globes are smooth and tough



Fig. 130. G-E rippling imparts just the right amount of diffusion, as well as life and sparkle, to the light

The glass globes used in Form 79 luminaires represent a great deal of illuminating engineering, as well as specialized manufacturing skill. Both the refracting and the nonrefracting types, are made of crystal-clear glass, pressed in molds to give uniform thickness, and annealed to eliminate strains. They have a smooth-finished edge that is hard to chip—and it is well to remember that chipped edges account for the great majority of broken globes. The well-known General Electric exterior rippling is used to give life and sparkle and just the right amount of diffusion for good appearance and effective lighting without impairing the strength of the glass. Interior prisms on the refractor globes are carefully designed and accurately formed. In all respects, there are sturdy attractive globes well suited to efficient and money-saving outdoor lighting service.



Fig. 131. Short globe or refractor
Form 79 globe shapes are attractive in appearance



Fig. 132. Long globe

* Manufactured under Aluminum Company of America patents.

Easy-to-live-with Features that Represent Extra Value in Form 79 Luminaires

Form 79 Glassware Is Factory-sealed for Low Renewal Cost



Fig. 133
79-S and -D, one
piece



Fig. 134
79-R spun-
sealed



Fig. 135
79-VR pressure-
sealed

The country-wide average of broken globes on spun-sealed Form 79 luminaires has been less than 3 per 100 luminaire-years of service over the past six years. Comparing this with the generally accepted average of 20 per cent loss in ordinary luminaires, it is obvious that glassware breakage has been eliminated as a serious factor in maintenance expense by sealing the globe and reflector together at the factory.

Three construction features are considered responsible for this excellent service record:

- (1). All glassware is carefully designed and rigidly inspected before assembly.
- (2). Assembly is made by skilled factory workers who are provided with all necessary means for preventing accidental damage to the globe edge during installation.
- (3). The edge of the globe is not exposed to damage during servicing operations.

Naturally, these features are incorporated in the new Form 79's. In Forms 79-S and -D, the reflector and globe are made in one piece, and the copper reinforcement is electroplated over the edge of the reflector. The reflector and refractor of the Form 79-R luminaire are necessarily separate pieces, and are spun-sealed with a steel band joining the two pieces of glass. The reflector and refractor of the Form 79-VR luminaire, which are not only separate pieces but are heavier than those of the 79-R, are pressure-sealed by interior bails that clamp the refractor firmly against the reflector, with uniform pressure around the entire circumference.

The fact that globes cannot readily be replaced in the field if broken need not cause concern; users have saved thousands of dollars in glassware maintenance cost by the use of the G-E factory-sealed construction. The G-E Form 79 has outsold all competing designs, and a vast majority of these Form 79's have been factory-sealed. Six years' experience with more than 100,000 luminaires has proved the advantage of this construction.

Form 79 Reflectors Are Supported Securely and Safely



Fig. 136. Spun collar used on Forms
79-S, -D, and -R reflectors



Fig. 137. Cast-iron collar and
bails used in Form 79-VR
reflectors

In order to conserve sheet metal for war purposes, the reflector supports of Form 79-S, -D, and -R luminaires consist of a small collar spun over the upper portion of the reflector (Fig. 136). This is made of rustproof steel (or copper if available) of sufficient weight and stiffness to hold securely to the reflector. The latches are riveted to the collar. The heads of the rivets, engaging in depressions provided in the reflector, key the reflector to the collar and prevent rotation with respect to the latches.

In the Form 79-VR, reflector and refractor are supported by steel-strap bails attached to a cast-iron collar (Fig. 137). This construction is preferred in this unit because of the larger size and weight of reflector and refractor. Observe that the bails are expanded so that if the refractor should be completely smashed, the reflector would not fall to the ground. This bail method of support has been used successfully for thirteen years to support the 25-pound glass globe in the G-E Novalux Form 32-B luminaire.

Easy-to-live-with Features that Represent Extra Value in Form 79 Luminaires

Form 79's Are Easy to Relamp

Simple, hand-operated toggle latches attach the optical unit to the hood, and relamping becomes simply a matter of disengaging these latches and suspending the optical unit by the safety chain that is provided. This exposes the lamp socket or receptacle so that not only lamps but those in normal condition, with broken bulbs or loose bases, are easily removed.



Fig. 138

Form 79's Are Easy to Mount and Wire

Any of the common methods of mounting and wiring can be easily followed with standard Form 79 hoods. These hoods are available for top or side mounting and for internal or external wiring. They can be wired in a variety of ways, with either single-conductor wire or duplex cable.

The hoods are easily attached to the bracket or hanger in a watertight construction. Pendant hoods have $1\frac{1}{4}$ -inch tapped pipe threads and a heavy hexagonal section for a wrench or vise. The slip-fitter hoods clamp securely with one large bolt on an unthreaded $1\frac{1}{4}$ -inch pipe. Universal-bracket hoods for direct-pole mounting accommodate two lag screws or through bolts. All these hoods are amply large for the convenient use of insulated cable. Entrance bushings, where used, are positioned to facilitate wiring.



Fig. 139. Pendant hood for pipe bracket or hanger



Fig. 140. Heat-insulated slip-fitter hood for pipe brackets

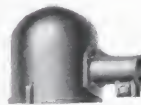


Fig. 141. Plain slip-fitter hood for pipe brackets



Fig. 142. Universal-bracket hood for direct-pole mounting

Form 79's Stay Clean and Dry Inside

The snug mechanical fit of the die-formed shoulder on the reflector against the machine seat on the hood makes a weatherproof and insectproof joint without the use of gaskets. The sealing pressure is uniform because three or four latches close a joint only approximately 20 inches in circumference. By contrast, the conventional type of hinged globe holder has one latch to close a joint more than 40 inches in circumference. With such a construction, a resilient gasket (such as felt) is essential, but the weather tightness thus obtained is known to be of limited duration because of deterioration.

Reports have been received of Form 79 luminaires that are so clean inside after two or three years' service that they do not appreciably soil a cleaning cloth. Such performance means high efficiency and attractive appearance without the expense of frequently cleaning or replacing gaskets.



Fig. 143
79-S, -D, and -R

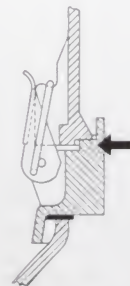


Fig. 144
79-VR

A dirtproof and bugproof servicing joint is obtained without gaskets

Form 79 Sockets and Receptacles Are Sturdy



Fig. 145
Socket
prongs



Fig. 146
Base
Assembly



Fig. 147
Porcelain-shell
series sockets



Fig. 148
Removable
socket shell



Fig. 149
Wet-process-porcelain series recep-
tacle with mounting plate

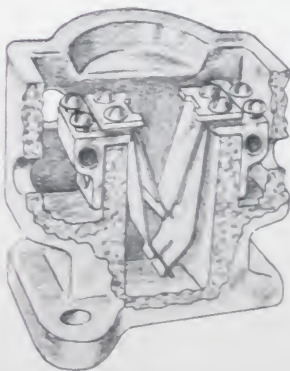


Fig. 150
Wet-process-porcelain series
receptacle

All the current-carrying parts of the sockets and receptacles used in Form 79 luminaires are nickel-plated brass or bronze; all insulation is porcelain. The sockets and receptacles are securely mounted in a position that places the lamp filament at the proper focal point in the optical system. They are interchangeable.

Particularly noteworthy is the series socket. The prongs are made in one piece, from tip to lamp contact, to prevent all possibility of burning or radio interference from loose parts. The heavy-duty series receptacle is made of the finest-quality wet-process porcelain and is rated 19 kv flashover. Sturdy phosphor bronze contact springs backed by stainless-steel reinforcing springs are used; guides are provided to assure proper positioning of the socket. The binding posts are of heavy cast bronze and are concealed in such a manner as to provide long creepage distance and to prevent accidental physical contact. The size of all parts and the contact pressure are adequate for 20-ampere operation. Since continuity of service depends so much upon good, solid electrical contact and good insulation to ground, this series socket and wet-process-porcelain receptacle are unquestionably to be recommended for straight series-circuit operation. They meet all requirements of the proposed NEMA-EEI Standards and Practices.



Fig. 151
Dry-process-porcelain
series receptacle



Fig. 152
Medium, multiple
socket with
supports for
shallow hood



Fig. 153
Mogul, multiple
socket with
supports for
deep hood

Form 79 External-wiring Bushings Are Convenient and Dependable



Fig. 154

Pendent hood with two series porcelain bushings with binding posts. (5000 volts, maximum)

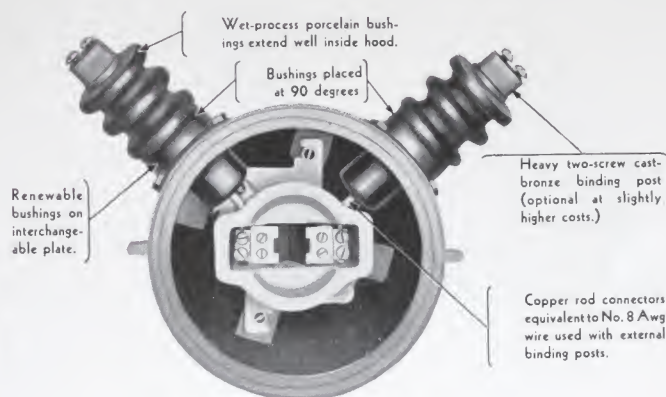


Fig. 155

External-wiring bushings for Form 79 hoods allow a great latitude in the choice of wiring methods. For cable wiring, there are two possibilities: The cable (or cables, if single-conductor) can enter either through rubber-packed, gland-type bushings which are waterproof and bugproof and in which the insulation is the same as that of the cable itself, or through porcelain bushings. These bushings relieve the cable insulation of providing a ground-proof entrance, but they should be caulked after the wiring is in place to exclude dust and bugs. For line-wire connections, individual porcelain bushings are the obvious answer, since the wire itself has no dependable insulation. Here, then is a choice between connecting to external binding posts or feeding the wire through bushings direct to the socket or receptacle terminals. The external binding posts offer maximum assurance that the connections will be weatherproof, but the connections must be made proof against vibration to prevent annoying open circuits.

All porcelain bushings are made of the best-quality wet-process electrical porcelain, which is virtually groundproof unless badly smashed. They

have a large factor of safety, both electrical and mechanical. Where binding posts are used, they consist of large blocks of cast bronze that are drilled to accommodate a No. 6 Awg line wire, and are equipped with screws large enough for a line-man's screw driver. They are nickel-plated to prevent corrosion. The connectors from binding posts to socket or receptacle terminals are made of hard copper, to which the binding post is screwed tightly against the porcelain. Where two bushings are used, they are placed 90 degrees apart in order to make the jump path from the bushing and to the bracket or reflector latch as long as possible and to get the bushings and leads out of the service man's way. The electrical ratings of these porcelain bushings meet all the requirements of the proposed NEMA-EEI Standards and Practices.

All bushings are mounted on interchangeable plates which are bolted and gasketed to the hood. A conveniently located setscrew fastens the porcelain bushings to the bushing plate.

All these combinations of bushings are designed to provide the best obtainable electrical insulation and mechanical strength.



Fig. 156

Low-voltage porcelain bushing plate with binding posts. (600 volts max.)



Fig. 157

Low-voltage porcelain bushing plate without binding post, for line wire. (600 volts, max.)



Fig. 158

Gland-bushing plate for single- or twin-conductor insulated cable. Specify outside dimensions of cable when ordering



Fig. 159

Series porcelain bushing plate without binding post, for line wire (5000 volts, max.)



Fig. 160

Series porcelain bushing plate for insulated cable up to 1 in. diam. (5000 volts, max.)

Use This HEAT-INSULATED Form 79 Hood for Straight-series Luminaires Mounted on Pipe Brackets and Internally Wired

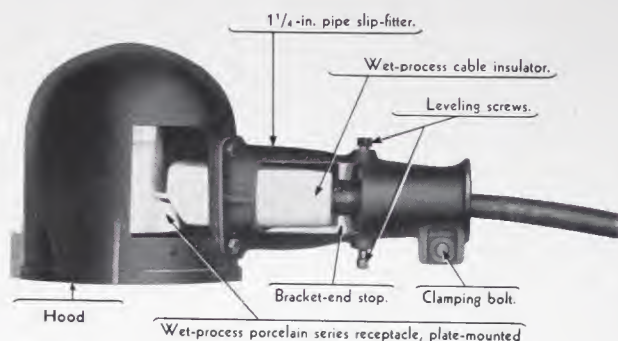


Fig. 161
Cutaway view of heat-insulated hood, showing cable insulator and receptacle

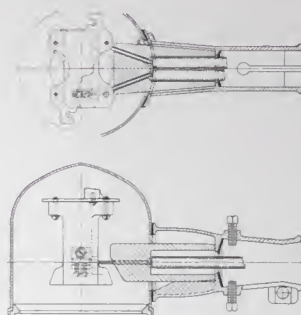


Fig. 162
Cross section of hood with internal insulator

The deterioration of cable insulation caused by heat is a factor to be considered in using metal-hood luminaires, especially on high-voltage series circuits. Even rubber insulation of excellent quality will deteriorate if exposed to temperatures above 75 C; and temperatures higher than that can be expected with large lamps. Hence, it is obvious that this factor has a bearing on the electrical reliability of the installation, and upon safety value, serviceability, and probable upkeep expense.

This heat-insulated hood contains a wet process-porcelain cable insulator within the slip fitter. This insulator, which is heatproof and moistureproof, substitutes for the vulnerable cable insulation, where damaging temperatures would be encountered. The conductors are well insulated from one another and from ground to assure a permanently safe wiring job if good-quality cable of proper voltage rating is used.

Because of the side entrance and plate-mounted receptacle, mounting and wiring are reduced to the simplest operations.

Use This UNIVERSAL BRACKET Form 79 Hood for Fence Lighting With Form 79-VR Luminaires

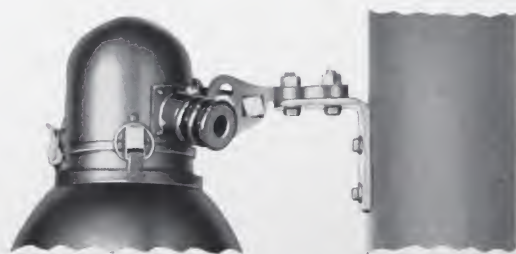


Fig. 163
Universal bracket, Form 79 hood

This simple universal mounting bracket saves money because it eliminates the conventional-type bracket; saves time because it is easy to mount and adjust; and saves effort in servicing because it places the luminaire close to the pole, where it is conveniently accessible.

It consists of a 3- by 3/4-inch steel angle with cast-iron swivels and hood fittings. Both swivels are equipped with sturdy clamping and holding bolts.

Range of adjustability:

Mounting plate: 15 degrees either side of center for leveling.

Horizontal swivel: 30 degrees each side of center, to parallel beam with fence.

Vertical swivel: 30 degrees each side of center, to obtain the desired amount of tilt.

A hood using this bracket requires a cable-entrance bushing for wiring. Any of those described on the preceding page are applicable.

Use Porcelain Insulator for Safety and Dependability on High-voltage Series Circuits

There are several well-known advantages of wet-process-porcelain insulators over metal hoods in high-voltage series operation that are often overlooked. Properly designed wet-process-porcelain heads eliminate dependence on cable insulation or bushings for safety and dependability.

They are sturdier and harder to break than most porcelain bushings. They eliminate the expense and difficulty of grounding the brackets when wired externally (such grounding is a highly desirable practice in all installations where metal-hood luminaires are operated straight series). They cost less to buy and maintain than many of the expedients devised to eliminate them. They are preferred for all series circuits and are required for circuits of more than 5000 volts in the proposed NEMA-EEI Practices and Standards.

The Form 79 optical units are available for all the standard porcelain insulators which General Electric manufactures; they can also be adapted to many other makes of insulators. Several of the commonly used insulator luminaires are illustrated. Observe that the form number that designates the insulator is retained, but letters are added to indicate that this Form 79-like reflector is used:

S corresponds to Form 79-S.

D corresponds to Form 79-D.

R corresponds to Form 79-R.

VR corresponds to Form 79-VR.

Additional information will be found in publications describing these particular forms of this unit.

The Form 72 insulator is worthy of special interest because of several important features:

▲Side-mounted for maximum light-center height.

▲Insulator is clamped securely around the waist instead of being suspended from the top. The purpose of this is to lessen the strain on the porcelain and to promote long life.

▲Cable duct snubs cable to prevent strain on connections.

▲Heat-insulated. Duct protects insulation from high temperature.

▲Groundproof even if carelessly wired. The insulation is in the porcelain.

▲Safe. No exposed live parts.

This advanced-design high-voltage insulator is a product of fifty years of practical experience in building safe, dependable equipment for series lighting circuits.



Fig. 164
Form 45H1S, or -D



Fig. 165
Form 45H3R

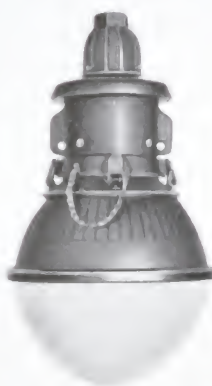


Fig. 166
Form 45H4R for external
or internal wiring



Fig. 167
Form 72-R for internal wiring
through 1 1/4-inch pipe



Fig. 168
Form 72-VR for internal
wiring through 1 1/4-inch pipe



Fig. 169
Form 72-VR with universal bracket and
external binding posts

Suggestions for Applying Form 79 Luminaires to Street Lighting

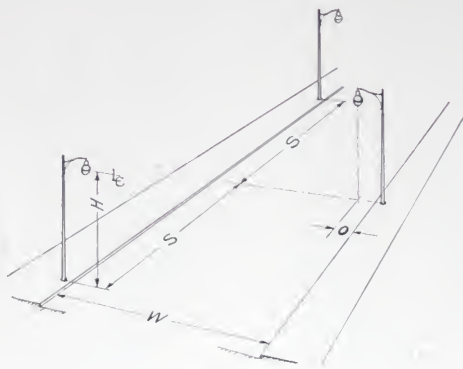


Fig. 170

Modern efficient luminaires deserve modern methods of application—in fact, only through use of the sound engineering principles of application that have been developed and codified in the past few years can a wholly satisfying result reasonably be expected. The IES Code of Street Lighting Practice is a practical guide, inasmuch as it represents the views of a large group of competent engineers whose interests lie in all phases of street and highway illumination. Therefore, anyone undertaking to design street-lighting systems should read carefully the IES Recommended Practice of Street Lighting, which is obtainable from the Illuminating Engineering Society, 51 Madison Avenue, New York City, or from the General Electric's Company Illuminating Laboratory at Schenectady.

The accompanying table was derived from the recommended averages of the IES Code by General Electric engineers, in order to show what is modern good practice with the G-E Novalux luminaire indicated.

Class of Street	Maximum-hour Night-time Traffic Count (Vehicles per hour)	For Roadway Width W	Luminaire Form	Height to Light Center H	Overhang O	Range of Normal Spacings S	Normal Lamp Size	Lumens per Square Foot Specified by IES Code		Calculated Avg Lumen per Square Feet from this Luminaire			
								Road Surface	Side-walks	ROAD SURFACE		SIDEWALKS	
										Short Spacing	Long Spacing	Short Spacing	Long Spacing
Residential	—	25 ft	{ 79-D 79-R 79-VR	22-24 ft 23-24 ft 23-24 ft	4 ft 4 ft 5 ft	125-175 ft 125-175 ft 150-225 ft	{ 2500 lumens or 150 watts	0.1	0.05	{ 0.20 0.28 0.18	{ 0.14 0.20 0.12	{ 0.11 0.13 0.14	{ 0.08 0.09 0.09
Light Traffic	150-500	30 ft	{ 79-D 79-R 79-VR	22-24 ft 23-25 ft 23-25 ft	5 ft 5 ft 6 ft	130-170 ft 130-170 ft 150-190 ft	{ 4000 lumens or 200 watts	0.2	0.05	{ 0.30 0.40 0.27	{ 0.23 0.30 0.21	{ 0.16 0.18 0.19	{ 0.12 0.14 0.15
Medium Traffic	500-1200	40 ft	{ 79-D 79-R 79-VR	22-25 ft 23-25 ft 23-25 ft	5 ft 5 ft 10 ft	100-125 ft 100-125 ft 125-140 ft	{ 6000 lumens or 300 watts	0.4	0.1	{ 0.52 0.66 0.46	{ 0.41 0.53 0.41	{ 0.26 0.26 0.29	{ 0.20 0.21 0.25
Heavy Traffic	1200-2400	50 ft	{ 79-D 79-R 79-VR	23-25 ft 24-25 ft 24-25 ft	6 ft 6 ft 12-15 ft	75-90 ft 75-90 ft 75-110 ft	{ 10,000 lumens or 500 watts	0.8	0.25	{ 1.0 1.2 1.2	{ 0.83 1.02 0.81	{ 0.49 0.50 0.63	{ 0.41 0.42 0.43

One lumen per square foot equals one foot-candle.

The value of lumens per square foot offers a convenient means of deciding the minimum total amount of light applicable and supplied, but the over-all quality of illumination is also influenced by the nature of the candlepower distribution from the luminaire. Practical experience shows, for example, that the Form 79-VR luminaire actually produces more satisfactory seeing conditions than Form 79-R when used as indicated above, despite longer spacing and fewer lumens per square foot.

This table covers only recommended averages. The character of a specific street and its pedestrian and vehicular traffic may justify a modification.

Traffic volume is maximum night-hour count in both directions.

A distance of 15 feet between curb and property line was used in the calculation of sidewalk illumination.

Streets carrying very heavy traffic, and retail business streets, usually require still higher levels of illumination, for which we recommend Form 81 luminaires.

Staggered spacing, as shown in the sketch, is essential with Form 79-VR luminaires where the distance to the far curb exceeds 20 feet.

Suggestions for Applying Form 79 Luminaires to Protective Lighting

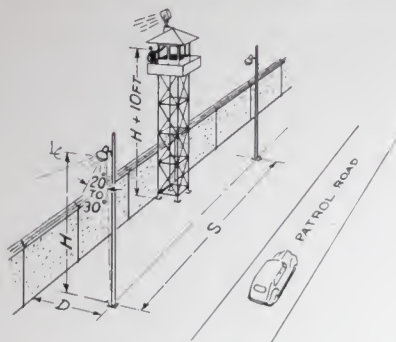


Fig. 171

	"High-intensity" Illumination		"Low-intensity" Illumination	
	Preferred	Alternate	Preferred	Minimum
S (Spacing).....	135 ft	185 ft	300 ft	300 ft
H (Height to Light-center)	25 ft	25 ft	29 ft	25 ft
D (Distance from fence to pole line)				
(a) When guarded from towers.....	15 ft	15 ft	15 ft	15 ft
(b) When guarded from patrol road.....	10 ft	10 ft	10 ft	10 ft
Lamp Size				
Lumens (series).....	6000	10,000	10,000	6000
Watts (multiple).....	300	500	500	300

A *typical industrial yard* is likely to require other lighting besides that for guarding a fence. For example, the area just inside the fence may be used for parking employees' cars or for storage of material or fuel. Form 79-S and -D luminaires are recommended for this dual lighting job.

If it is desired to light a considerable area on both sides of the fence, the symmetrical distribution provided by Form 79-S luminaires is suitable. However, if the area outside the fence need not be lighted, it is advisable to use the Form 79-D. The symmetrical distribution from this unit will provide acceptable lighting inside the fence with longer spacing between units—and therefore fewer luminaires for the job. Suggested spacings, heights, and lamp sizes are shown in the accompanying table.

It is strongly recommended that a corner or angle of the fence be illuminated by two luminaires, as shown. This will prevent a loss of visibility at this point in case of a lamp burnout.

If the area is of sufficient size and importance to require interior illumination as well (which may be the condition if there is more than 200 feet between fences), Form 79-S luminaires can be used on 125-foot centers (S-1) with the same size of lamp as that used in the fence-line unit.

Mount Form 79-D with deflector on the side toward the fence.

If a lower mounting height is preferred, the spacing of the luminaires should be decreased accordingly; but the height should not be less than 20 feet.

For *boundary-fence lighting*, the Form 79-VR light distribution is excellent, and the universal bracket method of mounting permits taking full advantage of the exceptional control of sidewise light. By adjusting the tilt of the luminaire, the width of the lighted zone can be adapted to the surroundings—light can be projected far out over open fields, or cut off 20 or 30 feet outside the fence line to shield nearby houses from glare or any distance between. Exceptionally good uniformity of illumination along the fence area can be obtained under all conditions. Tilting the luminaire also permits a patrolled road which is a few feet back of the pole line to be in such darkness that persons on the road cannot be seen from outside. No other luminaire offers so great a degree of adaptability to practical requirements as does the Form 79-VR; hence, it is the first choice for fence lighting in Specifications No. 6403-E, dated October 15, 1941, issued by the office of the Quartermaster General, War Department, where it is specified as Class 1.

The following recommendations are taken from War Department Specifications 6403-E, dated October 15, 1941. "High-intensity" illumination is recommended for critical areas such as munitions-manufacturing and storage areas, hangars, fuel-handling or storage facilities, electric power substations, or similar important areas.

"Low-intensity" illumination is recommended for military camps and areas that are not highly critical.

If a lower mounting height is preferred, the spacing of luminaires should be decreased proportionally, but the height should not be less than 20 feet.

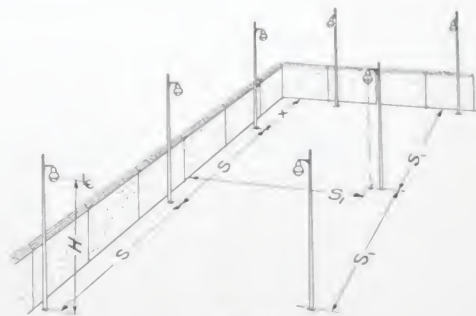


Fig. 172

Recommendations for Luminaires Located Along Fence Line

	Medium-level Lighting		Low-level Lighting	
	Form 79-D	Form 79-S	Form 79-D	Form 79-S
S (Spacing).....	125 ft	100 ft	150 ft	125 ft
H (Height to Light-center).	25 ft	25 ft	25 ft	25 ft
X (Distance to corner).....	40 ft	30 ft	40 ft	30 ft
Lamp Size				
Lumens (Series).....	6000	6000	4000	4000
Watts (Multiple).....	500	300	200	200

PRICES

Form 79S, 79D, 79R, and 79VR Luminaires For Multiple or Series Circuits up to 5000 Volts (For Pipe-bracket or Mast-arm Mounting)

HOOD		Glassware	Type of Receptacle (See Note 4)	Type of Socket	Cat. No. Green Finish	List Price GO-51	APPROX WT IN LB		CORRESPONDS TO SPUN-SEALED ALUMINUM—REFLECTOR LUMINAIRE, CAT. NO.	
Description	Fig. No. Page 22						Net	Ship.	Natural Aluminum Finish	Green Finish

With SERIES SOCKET and Receptacle for Circuits up to 5000 Volts

FORM 79-S; SYMMETRICAL LIGHT DISTRIBUTION

Deep pendent, tapped 1 1/4 in.	1	One-piece silvered-glass reflector and clear rippled globe	Wet-process	Series	ASG1	\$36.30	24	34	A4G140	A4G34
			Dry-process	Series	ASG2	34.60	24	34	A4G76	A4G10
Plain slip-fitter for 1 1/4-in. pipe	3		Wet-process	Series	ASG4	38.80	28	38	A4G137	A4G28
			Dry-process	Series	ASG5	37.10	28	38	A4G131	A4G4
Heat insulator slip-fitter, for 1 1/4-in. pipe	4		Wet-process	Series	ASG7	42.80	32	42	A4G175	.....

FORM 79-D; ASYMMETRICAL LIGHT DISTRIBUTION

Deep pendent, tapped 1 1/4 in.	1	One-piece silvered-glass reflector and clear rippled globe, with internal defectors	Wet-process	Series	ASG51	\$44.30	24	34	A4G141	A4G35
			Dry-process	Series	ASG52	42.60	24	34	A4G77	A4G11
Plain slip-fitter for 1 1/4-in. pipe	3		Wet-process	Series	ASG54	46.80	28	38	A4G138	A4G29
			Dry-process	Series	ASG55	45.10	28	38	A4G132	A4G5
Heat insulator slip-fitter, for 1 1/4-in. pipe	4		Wet-process	Series	ASG57	50.80	32	42	A4G176	.....

FORM 79-R; C-SYM-ETRIC LIGHT DISTRIBUTION

Deep pendent, tapped 1 1/4 in.	2	Silvered-glass reflector and G-E Holophane C-Sym-Etric rippled bowl refractor; Spun-sealed	Wet-process	Series	ASG31	\$46.40	32	42	A4G142	A4G36
			Dry-process	Series	ASG32	44.70	32	42	A4G78	A4G12
Plain slip-fitter, for 1 1/4-in. pipe	3		Wet-process	Series	ASG34	48.90	36	46	A4G139	A4G30
			Dry-process	Series	ASG35	47.20	36	46	A4G133	A4G6
Heat insulator slip-fitter, for 1 1/4-in. pipe	4		Wet-process	Series	ASG37	52.90	40	50	A4G177	.....

FORM 79-VR; SPECIAL NARROW-BAND LIGHT DISTRIBUTION

Deep pendent, tapped 1 1/4 in.	8	Silvered-glass reflector and G-E Holophane narrow-band vertical lateral rippled bowl refractor; assembled	Dry-process	Series	ASG42	\$46.70	39	54	A4G48	.....
			Wet-process	Series	ASG41	48.40	39	54	A4G46	.....
Plain slip-fitter, for 1 1/4-in. pipe	3		Dry-process	Series	ASG45	49.20	42	57	A4G251	.....
			Wet-process	Series	ASG47	54.90	46	61	A4G253	.....

With MULTIPLE SOCKET for Multiple-circuit and Type IL Transformer Series Operation (See Note 7, page 21)

FORM 79-S; SYMMETRICAL LIGHT DISTRIBUTION

Shallow pendent, tapped 1 1/4 in.	5	One-piece silvered-glass reflector and clear rippled globe.	Med. Mult	ASG8	\$32.40	22	32	3791593G75	3791593G3
			Mog. Mult	ASG9	32.60	22	32	3791593G73	3791593G1
Deep pendent, tapped 1 1/4 in.	1		Mog. Mult	ASG3	32.60	26	36	A4G73	A4G19
Plain slip fitter, for 1 1/4-in. pipe	3		Mog. Mult	ASG6	35.10	30	40	A4G134	A4G16

FORM 79-D; ASYMMETRICAL LIGHT DISTRIBUTION

Shallow pendent, tapped 1 1/4 in.	5	One-piece silvered-glass reflector and clear rippled globe, with internal defectors	Med. Mult	ASG58	\$40.40	22	32	3791593G76	3791593G4
			Mog. Mult	ASG59	40.60	22	32	3791593G74	3791593G2
Deep pendent, tapped 1 1/4 in.	1		Mog. Mult	ASG53	40.60	26	36	A4G74	A4G23
Plain slip-fitter, for 1 1/4-in. pipe	3		Mog. Mult	ASG56	43.10	30	40	A4G135	A4G17

FORM 79-R; C-SYM-ETRIC LIGHT DISTRIBUTION

Shallow pendent, tapped 1 1/4 in.	5	Silvered-glass reflector and G-E Holophane C-Sym-Etric rippled bowl refractor; Spun-sealed	Med. Mult	ASG38	\$42.50	26	36	3791593G86	3791593G14
			Mog. Mult.	ASG39	42.70	26	36	3791593G87	3791593G15
Deep pendent, tapped 1 1/4 in.	2		Mog. Mult	ASG33	42.70	30	40	A4G75	A4G24
Plain slip-fitter, for 1 1/4-in. pipe	3		Mog. Mult	ASG36	45.20	34	44	A4G136	A4G18

FORM 79-VR; SPECIAL NARROW-BAND LIGHT DISTRIBUTION

Deep pendent, tapped 1 1/4 in.	8	Silvered-glass reflector and G-E Holophane narrow-band vertical lateral rippled bowl refractor; assembled	Mog. Mult	ASG43	\$44.70	37	52	A4G44	.....
			Mog. Mult	ASG46	47.20	40	55	A4G252	.....

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PRICES
Form 79VR Luminaires
(With Universal Bracket for Mounting on Wooden Poles)

HOOD		Glassware	Type of Receptacle (See Note 4)	Type of Socket	Number and Type of Bushings	Cat. No. Green Finish	List Price GO-51	APPROX WT IN LB	
Description	Fig. No. Page 22							Net	Ship
With SERIES SOCKET and Receptacle for Circuits up to 5000 Volts									
Cast-iron with Universal bracket for wood pole	9	Silvered-glass reflector and G-E Holophane narrow-band vertical lateral rippled bowl refractor; assembled	Wet-process	Series	Single 5000-volt porcelain, for insulated cable.	A10SG9	\$53.90	46	61
			Wet-process	Series	Two 5000-volt porcelain, for line wire	A10SG10	53.90	47	62
			Wet-process	Series	Two 5000-volt porcelain, with external binding posts.	A10SG17	57.90	47	62
With MULTIPLE SOCKET for Multiple Circuit and Type IL Transformers Series Operation (See Note 7)									
Cast-iron with Universal bracket for wood pole	9	Silvered-glass reflector and G-E Holophane narrow-band vertical lateral rippled bowl refractor; assembled	.....	Mog. Mult	Two 600-volt porcelain, for line wire.	A10SG15	\$49.20	43	58
			.....	Mog. Mult	Single-gland type for insulated cable.	A10SG16	49.20	43	58

NOTES APPLYING TO TABLES ON PAGES 20 AND 21

- Exterior Finish**
Glossy dark-green enamel is standard. Gray (galvanized-color) paint finish supplied, if specified, at no additional charge.
- Pipe-tap Size**
Standard for pendent hoods is 1 1/4 in. Will be supplied with 2-in. pipe-tapped hood if specified, at no additional charge. Always specify pipe-tap size when ordering luminaires and brackets.
- Bushings for External Wiring on Luminaires, listed on Page 20**

Rubber-packed gland bushing for insulated cable, maximum outside dimensions; duplex .94 in., 2 single-conductor .43 in. each, (Specify outside dimensions of cable when ordering) Single open porcelain bushings with 1-in. dia. hole for belted duplex cable Two small open porcelain bushings at 90° with 1/2-in. dia. hole for single-conductor line wire Two large open porcelain bushings at 90° with 1/2-in. dia. hole for single-conductor line wire Two small porcelain bushings and external binding posts, at 90° Two large porcelain bushings and external binding posts, at 90°	Voltage Rating	Shown in Fig.	Add to List Price of Luminaire
	5000 (using suitable cable)	150	\$2.00 ea.
	5000	160	3.00 ea.
	600	157	2.00 per pair
	5000	159	3.00 per pair
	600	156	6.00 per pair
	5000	154	7.00 per pair

Voltage ratings of porcelain bushings conform to proposed NEMA-EEI Standards and Practices.
- Series Socket Receptacle**
"W.P." designates a wet-process porcelain series receptacle which has a dry flashover rating of 19 kv when mounted in the hood. Luminaires with this receptacle meet the proposed NEMA-EEI Standards and Practices, provided the other requirements of installation are complied with.
"D.P." designates a dry-process porcelain series receptacle recommended for operation on Type IL transformer secondary.
- Long Globe (Corresponding to 207)**
This globe (Fig. 6, page 22) is supplied on Form 79-S or -D luminaires, if specified, at no additional charge. A spun-sealed assembly of globe and reflector will be supplied.
- MAZDA Lamps**
Use street-series lamps, 7-in. light-center length, mogul screw base, 2500 to 10,000 lumens, or multiple lamps, 7-in. light-center length, mogul screw base, 300 or 500 watts.
Exception: Luminaires listed with medium multiple socket use 200 watt, 6-in. light-center length. PS-30 clear bulb, medium screw-base lamp.
Lamps not included in catalog number and price of luminaire.
- Operation from Type IL transformers is safer and generally more satisfactory if a series socket and film cutout are used in the luminaire.
- One film cutout is supplied with each luminaire equipped with series socket.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Form 79S, 79D, 79R, and 79VR Luminaires

(Dimensions are approximate)



Fig. 1
(Photo No. 732392)
Deep pendent hood
One-piece silvered-glass reflector
and globe (Form 79-S or -D)



Fig. 2
(Photo No. 732376)
Deep pendent hood
Spun-sealed silvered-glass
reflector and refractor
(Form 79-R)



Fig. 3
Plain slip-fitter hood
Spun-sealed silvered-glass reflector
and refractor
(Form 79-R)



Fig. 4
Heat-insulated slip-fitter hood
Spun-sealed silvered-glass reflector
and refractor (Form 79-R)



Fig. 5
Shallow pendent hood
One-piece silvered-glass reflector
and globe
(Form 79-S and -D)



Fig. 6
Heat-insulated slip-fitter hood
Spun-sealed silvered-glass reflector
and long globe (Form 79-S and -D)



Fig. 7
Heat-insulated slip-fitter hood
Form 79-VR silvered-glass
reflector and narrow-band
refractor



Fig. 8
(Photo No. 732307)
Deep pendent hood
Form 79-VR silvered-glass
reflector and narrow-band
refractor



Fig. 9
(Photo No. 732311)
Universal-bracket hood
Form 79-VR silvered-glass
reflector and narrow-band
refractor

WHEN SERVICE IS REQUIRED

THE facilities of our engineering departments and factories are available to purchasers of G-E apparatus through G-E service shops and sales offices, a list of which is given below.

When it is necessary to renovate, repair, or change apparatus to meet a new operating condition or a new application, the facilities of the nearest G-E service shop are at your disposal. Each of them is equipped to turn out work of the same high quality, both as to workmanship and materials, as at the factory. If it is necessary that the work be done on the customer's premises, the service shop is prepared to send trained, competent, and dependable men who will do it promptly and efficiently. Similarly, the sales office nearest you will be glad to help you with any engineering problems that may be involved.

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Chicago, Ill.	849 South Clinton Street	Philadelphia, Pa.	429 North Seventh Street
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Cleveland, Ohio	4966 Woodland Avenue	St. Louis, Mo.	1110 Delmar Boulevard
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Houston, Texas	1312 Live Oak Street	Seattle, Wash.	1508 Fourth Avenue, South
Kansas City, Mo.	819 East Nineteenth Street	West Lynn, Mass.	920 Western Avenue
Los Angeles, Calif.	5203 Santa Fe Avenue		

Special service divisions are also maintained at the following Works of the Company: Erie, Pa.; Ft. Wayne, Ind.; Pittsfield, Mass.; Schenectady, N. Y.; and West Lynn, Mass. (West Lynn Works)

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Cleveland, Ohio	4966 Woodland Avenue	Providence, R. I.	111 Westminster Street
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